



EBERLINE
SERVICES

0060023

May 30, 2003

Mr. Steve Trent
Fluor Hanford Inc.
825 Jadwin Avenue
Richland, WA 99352

Reference: P.O. #630
Eberline Services R3-05-103-7519, SDG H2211

Dear Mr. Trent:

Enclosed is the data report for one other solid sample designated under SAF No. F03-012 received at Eberline Services on May 16, 2003. The sample was analyzed according to the accompanying chain-of-custody document.

Please call if you have any questions concerning this report.

Sincerely,

Melissa C. Mannion
Program Manager

MCM

Enclosure: Data Package



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1.0 GENERAL

Fluor Hanford Inc. (FH) Sample Delivery Group H2211 was composed of one other solid sample designated under SAF No. F03-012 with a Project Designations of: 200-PW-2/200-PW-4 OU – Other Solid.

The sample was received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

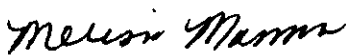
2.0 ANALYSIS NOTES

2.1 Gamma Spectroscopy Analyses

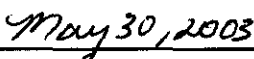
No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."



Melissa C. Mannion
Program Manager



Date

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2211

SDG 7519
Contact Melissa C. Mannion

Client Hanford
Contract No. 630
Case no SDG_H2211

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Melissa Mannion
Prepared by

Melissa Mannion
Reviewed by

Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-TOC
Version 3.06
Report date 05/30/03

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2211

SDG 7519
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford
Contract No. 630
Case no SDG H2211

ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

The Sample and QC Summary Reports show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

METHOD BLANKS

The Method Blank Reports, one for each Method Blank relevant to the SDG, show all results and primary supporting information for the blanks.

LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 05/30/03

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2211

SDG 7519
Contact Melissa C. Mannion

GUIDE , c o n t .

Client Hanford
Contract No. 630
Case no SDG H2211

ABOUT THE DATA SUMMARY SECTION

DUPLICATES

The Duplicate Reports, one for each Duplicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show all results, QC and method performance data for one analyte on one or two pages. (A test is a short code for the method used to do certain work to the client's specification.)

REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 05/30/03

EBERLINE SERVICES/RICHMOND
SAMPLE DELIVERY GROUP H2211

SDG 7519
Contact Melissa C. Mannion

LAB SAMPLE SUMMARY

Client Hanford
Contract No. 630
Case no SDG H2211

LAB SAMPLE ID	CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	SAF NO	CHAIN OF CUSTODY	COLLECTED
R305103-01	B17107	200-PW-2/200-PW-4 Reten.	SOLID		F03-012	F03-012-002	05/13/03 10:35
R305103-02	Lab Control Sample		SOLID		F03-012		
R305103-03	Method Blank		SOLID		F03-012		
R305103-04	Duplicate (R305103-01)	200-PW-2/200-PW-4 Reten.	SOLID		F03-012		05/13/03 10:35

EBERLINE SERVICES/RICHMOND
SAMPLE DELIVERY GROUP H2211

SDG 7519
 Contact Melissa C. Mannion

QC SUMMARY

Client Hanford
 Contract No. 630
 Case no SDG H2211

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7519	F03-012-002	B17107	SOLID	100.0	1636 g		05/16/03 3	R305103-01		7519-001
		Method Blank	SOLID						R305103-03	7519-003
		Lab Control Sample	SOLID						R305103-02	7519-002
		Duplicate (R305103-01)	SOLID	100.0	1636 g		05/16/03 3	R305103-04		7519-004

Lab id EBRLNE
 Protocol Hanford
 Version Ver 1.0
 Form DVD-QS
 Version 3.06
 Report date 05/30/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2211

SDG 7519

Contact Melissa C. Mannion

PREP BATCH SUMMARY

Client Hanford

Contract No. 630

Case no SDG H2211

TEST	MATRIX	METHOD	PREPARATION ERROR		PLANCHETS ANALYZED				QUALIFIERS	
			BATCH	2σ %	CLIENT	MORE	RE	BLANK		LCS
Gamma Spectroscopy										
GAM	SOLID	Gamma Scan	7060-205	15.0	1			1	1	1/1

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

PREP BATCH SUMMARY

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SUMMARY DATA SECTION

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Lab id EBRLNE

Protocol Hanford

Version Ver 1.0

Form DVD-PBS

Version 3.06

Report date 05/30/03

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2211

LAB WORK SUMMARY

SDG 7519

Contact Melissa C. Mannion

Client Hanford

Contract No. 630

Case no SDG H2211

LAB SAMPLE COLLECTED RECEIVED	CLIENT SAMPLE ID LOCATION CUSTODY	MATRIX SAF No	PLANCHET	TEST	SUF- FIX	ANALYZED	REVIEWED	BY	METHOD
R305103-01 05/13/03 05/16/03	B17107 200-PW-2/200-PW-4 Reten. F03-012-002	SOLID F03-012	7519-001	GAM		05/21/03	05/30/03	MCM	Gamma Scan
R305103-02	Lab Control Sample	SOLID F03-012	7519-002	GAM		05/20/03	05/30/03	MCM	Gamma Scan
R305103-03	Method Blank	SOLID F03-012	7519-003	GAM		05/20/03	05/30/03	MCM	Gamma Scan
R305103-04 05/13/03 05/16/03	Duplicate (R305103-01) 200-PW-2/200-PW-4 Reten. F03-012	SOLID	7519-004	GAM		05/20/03	05/30/03	MCM	Gamma Scan

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
GAM	F03-012	Gamma Scan	GAMMA_GS	1			1	1	1		4
TOTALS				1			1	1	1		4

WORK SUMMARY

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SUMMARY DATA SECTION

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Lab id EBRLNE

Protocol Hanford

Version Ver 1.0

Form DVD-LWS

Version 3.06

Report date 05/30/03

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2211

7519-003

Method Blank

METHOD BLANK

SDG <u>7519</u>	Client/Case no <u>Hanford</u>	SDG <u>H2211</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R305103-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7519-003</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>F03-012</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	U		0.17		U	GAM
Cobalt 60	10198-40-0	U		0.009	0.050	U	GAM
Cesium 137	10045-97-3	U		0.007	0.10	U	GAM
Radium 226	13982-63-3	U		0.015		U	GAM
Radium 228	15262-20-1	U		0.031		U	GAM
Europium 152	14683-23-9	U		0.018	0.10	U	GAM
Europium 154	15585-10-1	U		0.019	0.10	U	GAM
Europium 155	14391-16-3	U		0.023	0.10	U	GAM
Thorium 228	14274-82-9	U		0.010		U	GAM
Thorium 232	TH-232	U		0.031		U	GAM
Uranium 235	15117-96-1	U		0.027		U	GAM
Uranium 238	U-238	U		0.87		U	GAM
Americium 241	14596-10-2	U		0.036		U	GAM

200-PW-2/200-PW-4 OU - Other Solid

QC-BLANK #44719

EBERLINE SERVICES/RICHMOND
SAMPLE DELIVERY GROUP H2211

7519-002

Lab Control Sample

LAB CONTROL SAMPLE

SDG <u>7519</u>	Client/Case no <u>Hanford</u>	SDG <u>H2211</u>
Contact <u>Melissa C. Mannion</u>	Contract <u>No. 630</u>	
Lab sample id <u>R305103-02</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7519-002</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>F03-012</u>	

ANALYTE	RESULT pCi/g	2 σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ADDED pCi/g	2 σ ERR pCi/g	REC %	3 σ LMTS (TOTAL)	PROTOCOL LIMITS
Cobalt 60	0.251	0.023	0.013	0.050		GAM	0.261	0.010	96	74-126	80-120
Cesium 137	0.257	0.021	0.016	0.10		GAM	0.253	0.010	102	73-127	80-120

200-PW-2/200-PW-4 OU - Other Solid

QC-LCS #44718

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2211

7519-004

B17107

DUPLICATE

SDG <u>7519</u>		Client/Case no <u>Hanford</u> SDG <u>H2211</u>	
Contact <u>Melissa C. Mannion</u>		Contract No. <u>630</u>	
DUPLICATE		ORIGINAL	
Lab sample id <u>R305103-04</u>	Lab sample id <u>R305103-01</u>	Client sample id <u>B17107</u>	
Dept sample id <u>7519-004</u>	Dept sample id <u>7519-001</u>	Location/Matrix <u>200-PW-2/200-PW-4 Reten. SOLID</u>	
	Received <u>05/16/03</u>	Collected/Weight <u>05/13/03 10:35</u> <u>1636 g</u>	
% solids <u>100.0</u>	% solids <u>100.0</u>	Custody/SAF No <u>F03-012-002</u> <u>F03-012</u>	

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI- FIERS	RPD %	3σ TOT	PROT LIMIT
Potassium 40	11.0	0.72	0.16			GAM	9.97	0.40	0.23		10	34	
Cobalt 60	U		0.017	0.050	U	GAM	U		0.018	U	-		
Cesium 137	0.643	0.027	0.022	0.10		GAM	0.613	0.029	0.024		5	33	
Radium 226	0.412	0.037	0.034			GAM	0.402	0.039	0.040		2	37	
Radium 228	0.640	0.084	0.077			GAM	0.624	0.076	0.081		3	42	
Europium 152	U		0.048	0.10	U	GAM	U		0.048	U	-		
Europium 154	U		0.053	0.10	U	GAM	U		0.059	U	-		
Europium 155	U		0.058	0.10	U	GAM	U		0.049	U	-		
Thorium 228	0.560	0.024	0.020			GAM	0.553	0.022	0.022		1	33	
Thorium 232	0.640	0.084	0.077			GAM	0.624	0.076	0.081		3	42	
Uranium 235	U		0.069		U	GAM	U		0.077	U	-		
Uranium 238	U		1.9		U	GAM	U		2.0	U	-		
Americium 241	U		0.025		U	GAM	U		0.068	U	-		

200-PW-2/200-PW-4 OU - Other Solid

QC-DUP#1 44720

DUPLICATES

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SUMMARY DATA SECTION

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Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DUP</u>
Version <u>3.06</u>
Report date <u>05/30/03</u>

EBERLINE SERVICES / RICHMOND
SAMPLE DELIVERY GROUP H2211

7519-001

B17107

D A T A S H E E T

SDG <u>7519</u>	Client/Case no <u>Hanford</u>	SDG <u>H2211</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R305103-01</u>	Client sample id <u>B17107</u>	
Dept sample id <u>7519-001</u>	Location/Matrix <u>200-PW-2/200-PW-4 Reten. SOLID</u>	
Received <u>05/16/03</u>	Collected/Weight <u>05/13/03 10:35</u> <u>1636 g</u>	
% solids <u>100.0</u>	Custody/SAF No <u>F03-012-002</u> <u>F03-012</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Potassium 40	13966-00-2	9.97	0.40	0.23			GAM
Cobalt 60	10198-40-0	U		0.018	0.050	U	GAM
Cesium 137	10045-97-3	0.613	0.029	0.024	0.10		GAM
Radium 226	13982-63-3	0.402	0.039	0.040			GAM
Radium 228	15262-20-1	0.624	0.076	0.081			GAM
Europium 152	14683-23-9	U		0.048	0.10	U	GAM
Europium 154	15585-10-1	U		0.059	0.10	U	GAM
Europium 155	14391-16-3	U		0.049	0.10	U	GAM
Thorium 228	14274-82-9	0.553	0.022	0.022			GAM
Thorium 232	TH-232	0.624	0.076	0.081			GAM
Uranium 235	15117-96-1	U		0.077		U	GAM
Uranium 238	U-238	U		2.0		U	GAM
Americium 241	14596-10-2	U		0.068		U	GAM

200-PW-2/200-PW-4 OU - Other Solid

DATA SHEETS

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Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/30/03</u>

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP H2211

Test GAM Matrix SOLID
SDG 7519
Contact Melissa C. Mannion

LAB METHOD SUMMARY

GAMMA SCAN
GAMMA SPECTROSCOPY

Client Hanford
Contract No. 630
Contract SDG H2211

RESULTS

LAB RAW SUF-
SAMPLE ID TEST FIX PLANCHET CLIENT SAMPLE ID Cobalt 60 Cesium 137

Preparation batch 7060-205

R305103-01	7519-001	B17107	U	0.613
R305103-02	7519-002	LCS (QC ID=44718)	ok	ok
R305103-03	7519-003	BLK (QC ID=44719)	U	U
R305103-04	7519-004	Duplicate (R305103-01)	- U	ok

Nominal values and limits from method RDLs (pCi/g) 0.050 0.10
200-PW-2/200-PW-4 OU - Other Solid

METHOD PERFORMANCE

LAB	RAW	SUF-	MDA	ALIQ	PREP	DILU-	YIELD	EFF	COUNT	FWHM	DRIFT	DAYS	ANAL-				
SAMPLE ID	TEST	FIX	CLIENT	SAMPLE ID	pCi/g	g	FAC	TION	%	%	min	keV	KeV	HELD	PREPARED	YZED	DETECTOR

Preparation batch 7060-205 2σ prep error 15.0 % Reference Lab Notebook 7060 pg. 205

R305103-01	B17107	0.14	916	501	8	05/20/03	05/21	02,03,00
R305103-02	LCS (QC ID=44718)	0.013	916	233		05/20/03	05/20	MB,05,00
R305103-03	BLK (QC ID=44719)	0.054	916	237		05/20/03	05/20	MB,08,00
R305103-04	Duplicate (R305103-01)	0.13	916	236	7	05/20/03	05/20	MB,07,00
	(QC ID=44720)							

Nominal values and limits from method 0.050 916 100 180

PROCEDURES REFERENCE GAMMA_GS
CP-100 Ge(Li) Preparation for Commercial Samples, rev 5

AVERAGES ± 2 SD MDA 0.084 ± 0.12
FOR 4 SAMPLES YIELD _____ ± _____

METHOD SUMMARIES

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SUMMARY DATA SECTION

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Protocol Hanford
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Form DVD-LMS
Version 3.06
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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2211

SDG 7519
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford
Contract No. 630
Case no SDG H2211

SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- * LAB SAMPLE ID is the lab's primary identification for a sample.
- * DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- * CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- * QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

- * All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id EBRLNE
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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2211

SDG 7519
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford
Contract No. 630
Case no SDG_H2211

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- * The preparation batches are shown in the same order as the Method Summary Reports are printed.
- * Only analyses of planchets relevant to the SDG are included.
- * Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- * The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified.
Transcription errors are possible.
- P One or more results are 'preliminary'. The data is not ready for final reporting.
- 2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id EBRLNE
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Version Ver 1.0
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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2211

SDG 7519
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford
Contract No. 630
Case no SDG_H2211

WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- * TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- * SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- * The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- * PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- * For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- * The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

REPORT GUIDES

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SUMMARY DATA SECTION

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SAMPLE DELIVERY GROUP H2211

SDG 7519
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford
Contract No. 630
Case no SDG H2211

DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- * TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- * The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- * ERRORS can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- * A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- * When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity).

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 05/30/03

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP H2211

SDG 7519
Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford
Contract No. 630
Case no SDG H2211

DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

- J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.
- B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

- L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.
- H Similar to 'L' except the recovery was high.
- P The RESULT is 'preliminary'.
- X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.
- 2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

- * An MDA is underlined if it is bigger than its RDL.

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GUIDE, cont.

Client Hanford
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DATA SHEET

- * An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- * A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- * When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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Lab id EBRLNE
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REPORT GUIDE

Client Hanford
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LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- * All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- * An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- * REC (Recovery) is RESULT divided by ADDED expressed as a percent.
- * The first, computed limits for the recovery reflect:
 1. The error of RESULT, including that introduced by rounding the result prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.
 2. The error of ADDED.
 3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- * The second limits are protocol defined upper and lower QC limits for the recovery.
- * The recovery is underlined if it is outside either of these ranges.

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DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

- * All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- * The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTS divided by their average expressed as a percent.

If both RESULTS are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

- * The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTS prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTS. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- * The second limit for the RPD is the larger of:

1. A fixed percentage specified in the protocol.

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Client Hanford
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DUPLICATE

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

- * The RPD is underlined if it is greater than either limit.
- * If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

- * The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

- * All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- * An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- * REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

- * The first, computed limits for the recovery reflect:

1. The errors of the two RESULTS, including those introduced by rounding them prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

2. The error of ADDED.

3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

- * The second limits are protocol defined upper and lower QC limits

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Contact Melissa C. Mannion

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Client Hanford
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MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

- * The recovery is underlined (out of spec) if it is outside either of these ranges.

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METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

- * Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

- * The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

- * If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- * Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.
- * Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

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GUIDE, cont.

Client Hanford
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METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- * Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
 - * If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.
- MDAs are underlined if greater than the printed RDL.
- * Aliquots are underlined if less than the nominal value specified for the method.
 - * Preparation factors are underlined if greater than the nominal value specified for the method.
 - * Dilution factors are underlined if greater than the nominal value specified for the method.
 - * Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
 - * Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
 - * Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

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METHOD SUMMARY

- * Count times are underlined if less than the nominal value specified for the method.
- * Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- * Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- * Days Held are underlined if greater than the holding time specified in the protocol.
- * Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1+3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

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Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford
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Case no SDG H2211

METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

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SUMMARY DATA SECTION

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Lab id EBRLNE
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 05/30/03

FH-Central Plateau Project		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-012-002		Page 1 of 1			
Collector Johansen/Pope/Pfister		Company Contact Steve Trent		Telephone No. 373-5869		Project Coordinator TRENT, SJ		Price Code 9C Data Turnaround 15 Days			
Project Designation 200-PW-2/200-PW-4 OU - Other Solid		Sampling Location 200-PW-2/200-PW-4 Retention Basin H2211 (7519)		SAF No. F03-012		Air Quality <input type="checkbox"/>					
Ice Chest No. ERC 01011		Field Logbook No. HNF-336-1		COA 117504ES10		Method of Shipment Federal Express					
Shipped To EBERLINE SERVICES (Formerly TMA)		Offsite Property No. A030259		Bill of Lading/Air Bill No. SEE OSPC							
POSSIBLE SAMPLE HAZARDS/REMARKS N/A Special Handling and/or Storage N/A				Preservation		None	None				
				Type of Container		aG	aG				
				No. of Container(s)		1	1				
				Volume		120mL	1000mL				
SAMPLE ANALYSIS				See item (1) in Special Instructions.		See item (2) in Special Instructions.					
Sample No.		Matrix *		Sample Date		Sample Time					
B17107		OTHER SOLID		5-13-03		1035		B17107			
CHAIN OF POSSESSION				Sign/Print Names				SPECIAL INSTRUCTIONS			
Relinquished By/Removed From PH Date/Time 180		Received By/Stored In ERC Date/Time		N/A 5-12-03 (1) ICP Metals - 6010A (Supertrace) (Arsenic, Barium, Lead, Selenium, Silver), ICP Metals - 6010A (Supertrace Add-On) (Antimony, Beryllium, Bismuth, Boron, Copper, Nickel), Mercury - 7420 (CV) (2) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155) Personnel not available to relinquish samples from the 3728 Ref # 1A on 5/15/03				Matrix * S=Soil SE=Sediment SO=Solid SL=Sludge W=Water O=Oil A=Air DS=Drum Solids DL=Drum Liquids T=Tissue WI=Wipe L=Liquid V=Vegetation X=Other			
Relinquished By/Removed From ERC Date/Time 180		Received By/Stored In ERC Date/Time									
Relinquished By/Removed From REF 1A Date/Time 5/15/03 0900		Received By/Stored In 5/15/03 0900									
Relinquished By/Removed From 5/15/03 0900		Received By/Stored In FED EX									
Relinquished By/Removed From FED EX		Received By/Stored In 5/16/03 1000									
Relinquished By/Removed From		Received By/Stored In									
LABORATORY SECTION		Received By		Title				Date/Time			
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By				Date/Time			

**ANALYTICAL SERVICES GROUP**

Richmond, CA Laboratory

SAMPLE RECEIPT CHECKLIST

Client: FLR Date/Time received 1000 5-16-03

CoC No. F03-012-002

Container I.D. No. GR (-01-01) Requested TAT (Days) 15 P.O. Received Yes [] No []

INSPECTION

1. Custody seals on shipping container intact? Yes [☒] No [] N/A []
2. Custody seals on shipping container dated & signed? Yes [☒] No [] N/A []
3. Custody seals on sample containers intact? Yes [☒] No [] N/A []
4. Custody seals on sample containers dated & signed? Yes [☒] No [] N/A []
5. Packing material is: Wet [] Dry [☒]
6. Number of samples in shipping container: 1
7. Number of containers per sample: 1 (Or see CoC)
8. Paperwork agrees with samples? Yes [☒] No []
9. Samples have: Tape [] Hazard labels [] Rad labels [☒] Appropriate sample labels [☒]
10. Samples are: In good condition [☒] Leaking [] Broken Container [] Missing []
11. Samples are: Preserved [] Not preserved [☒] Preservative
12. Describe any anomalies:
13. Was P.M. notified of any anomalies? Yes [] No [] Date
14. Received by [Signature] Date: 5-16-03 Time: 1000

Customer Sample				Customer Sample			
No.	cpm	mR/hr	wipe	No.	cpm	mR/hr	wipe
<u>R17107</u>	<u>200</u>	<u>.024</u>					

Ion Chamber Ser. No. 4011Calibration date 3-20-03Alpha Meter Ser. No. Calibration date Beta/Gamma Meter Ser. No. 99574Calibration date 12-12-02



4 June 2003

Mr. Steve Trent
Fluor Hanford Inc.
825 Jadwin Ave.
Richland, WA 99352

Subject: Contract No. 630
Analytical Data Package



Dear Mr. Trent:

Enclosed are the hard copy analytical reports for the batch number/fraction indicated (marked X) in the following table:

LvLI Batch #	0305L428
SDG #	H2211
SAF #	F03-012
Date Received	5-16-03
# Samples	1
Matrix	Soil
Volatiles	
Semivolatiles	
Pest/PCB	
DRO/GRO/KRO	
Herbicides	
GC Alcohol	
Metals	X
Inorganics	

The electronic data deliverable (EDD) will be emailed shortly. If you have any questions, please don't hesitate to contact me at (610) 280-3012.

Sincerely,
Lionville Laboratory Incorporated


Orlette S. Johnson
Project Manager

r:\group\pm\orlette\tnu-hanford\data\fc_ltrs.doc

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD F03-012 H2211



DATE RECEIVED: 05/16/03

LVL LOT # :0305L428

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
---------------------	-------	-----	--------	------------	-----------	----------

B17107

SILVER, TOTAL	001		SO 03L0284	05/13/03	05/22/03	05/30/03
SILVER, TOTAL	001 REP		SO 03L0284	05/13/03	05/22/03	05/30/03
SILVER, TOTAL	001 MS		SO 03L0284	05/13/03	05/22/03	05/30/03
ARSENIC, TOTAL	001		SO 03L0284	05/13/03	05/22/03	05/30/03
ARSENIC, TOTAL	001 REP		SO 03L0284	05/13/03	05/22/03	05/30/03
ARSENIC, TOTAL	001 MS		SO 03L0284	05/13/03	05/22/03	05/30/03
BORON, TOTAL	001		SO 03L0284	05/13/03	05/22/03	05/30/03
BORON, TOTAL	001 REP		SO 03L0284	05/13/03	05/22/03	05/30/03
BORON, TOTAL	001 MS		SO 03L0284	05/13/03	05/22/03	05/30/03
BARIUM, TOTAL	001		SO 03L0284	05/13/03	05/22/03	05/30/03
BARIUM, TOTAL	001 REP		SO 03L0284	05/13/03	05/22/03	05/30/03
BARIUM, TOTAL	001 MS		SO 03L0284	05/13/03	05/22/03	05/30/03
BERYLLIUM, TOTAL	001		SO 03L0284	05/13/03	05/22/03	05/30/03
BERYLLIUM, TOTAL	001 REP		SO 03L0284	05/13/03	05/22/03	05/30/03
BERYLLIUM, TOTAL	001 MS		SO 03L0284	05/13/03	05/22/03	05/30/03
BISMUTH, TOTAL	001		SO 03L0284	05/13/03	05/22/03	05/30/03
BISMUTH, TOTAL REP	001 REP		SO 03L0284	05/13/03	05/22/03	05/30/03
BISMUTH, TOTAL SPIKE	001 MS		SO 03L0284	05/13/03	05/22/03	05/30/03
COPPER, TOTAL	001		SO 03L0284	05/13/03	05/22/03	05/30/03
COPPER, TOTAL	001 REP		SO 03L0284	05/13/03	05/22/03	05/30/03
COPPER, TOTAL	001 MS		SO 03L0284	05/13/03	05/22/03	05/30/03
MERCURY, TOTAL	001		SO 03C0122	05/13/03	05/21/03	05/22/03
MERCURY, TOTAL	001 REP		SO 03C0122	05/13/03	05/21/03	05/22/03
MERCURY, TOTAL	001 MS		SO 03C0122	05/13/03	05/21/03	05/22/03
NICKEL, TOTAL	001		SO 03L0284	05/13/03	05/22/03	05/30/03
NICKEL, TOTAL	001 REP		SO 03L0284	05/13/03	05/22/03	05/30/03
NICKEL, TOTAL	001 MS		SO 03L0284	05/13/03	05/22/03	05/30/03
LEAD, TOTAL	001		SO 03L0284	05/13/03	05/22/03	05/30/03
LEAD, TOTAL	001 REP		SO 03L0284	05/13/03	05/22/03	05/30/03
LEAD, TOTAL	001 MS		SO 03L0284	05/13/03	05/22/03	05/30/03
ANTIMONY, TOTAL	001		SO 03L0284	05/13/03	05/22/03	05/30/03
ANTIMONY, TOTAL	001 REP		SO 03L0284	05/13/03	05/22/03	05/30/03
ANTIMONY, TOTAL	001 MS		SO 03L0284	05/13/03	05/22/03	05/30/03
SELENIUM, TOTAL	001		SO 03L0284	05/13/03	05/22/03	05/30/03
SELENIUM, TOTAL	001 REP		SO 03L0284	05/13/03	05/22/03	05/30/03

Lionville Laboratory, Inc.
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNUHANFORD F03-012 H2211

DATE RECEIVED: 05/16/03

LVL LOT # :0305L428

CLIENT ID /ANALYSIS	LVL #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
SELENIUM, TOTAL	001 MS	SO	03L0284	05/13/03	05/22/03	05/30/03

LAB QC:

SILVER LABORATORY	LC1 BS	S	03L0284	N/A	05/22/03	05/30/03
SILVER, TOTAL	MB1	S	03L0284	N/A	05/22/03	05/30/03
ARSENIC LABORATORY	LC1 BS	S	03L0284	N/A	05/22/03	05/30/03
ARSENIC, TOTAL	MB1	S	03L0284	N/A	05/22/03	05/30/03
BORON LABORATORY	LC1 BS	S	03L0284	N/A	05/22/03	05/30/03
BORON, TOTAL	MB1	S	03L0284	N/A	05/22/03	05/30/03
BARIUM LABORATORY	LC1 BS	S	03L0284	N/A	05/22/03	05/30/03
BARIUM, TOTAL	MB1	S	03L0284	N/A	05/22/03	05/30/03
BERYLLIUM LABORATORY	LC1 BS	S	03L0284	N/A	05/22/03	05/30/03
BERYLLIUM, TOTAL	MB1	S	03L0284	N/A	05/22/03	05/30/03
BISMUTH, LCS	LC1 BS	S	03L0284	N/A	05/22/03	05/30/03
BISMUTH, TOTAL	MB1	S	03L0284	N/A	05/22/03	05/30/03
COPPER LABORATORY	LC1 BS	S	03L0284	N/A	05/22/03	05/30/03
COPPER, TOTAL	MB1	S	03L0284	N/A	05/22/03	05/30/03
MERCURY LABORATORY	LC1 BS	S	03C0122	N/A	05/21/03	05/22/03
MERCURY, TOTAL	MB1	S	03C0122	N/A	05/21/03	05/22/03
NICKEL LABORATORY	LC1 BS	S	03L0284	N/A	05/22/03	05/30/03
NICKEL, TOTAL	MB1	S	03L0284	N/A	05/22/03	05/30/03
LEAD LABORATORY	LC1 BS	S	03L0284	N/A	05/22/03	05/30/03
LEAD, TOTAL	MB1	S	03L0284	N/A	05/22/03	05/30/03
ANTIMONY LABORATORY	LC1 BS	S	03L0284	N/A	05/22/03	05/30/03
ANTIMONY, TOTAL	MB1	S	03L0284	N/A	05/22/03	05/30/03
SELENIUM LABORATORY	LC1 BS	S	03L0284	N/A	05/22/03	05/30/03
SELENIUM, TOTAL	MB1	S	03L0284	N/A	05/22/03	05/30/03



Analytical Report

Client: TNU-HANFORD F03-012
LVL#: 0305L428
SDG/SAF#: H2211/F03-012

W.O.#: 11343-606-001-9999-00
Date Received: 05-16-03

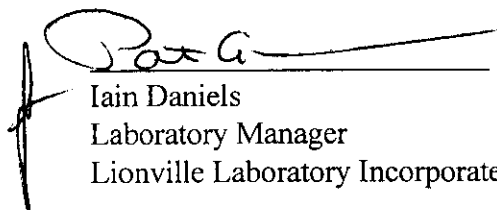
METALS CASE NARRATIVE

1. This narrative covers the analysis of 1 soil sample.
2. The sample was prepared and analyzed in accordance with methods checked on the attached glossary.
3. All analyses were performed within the required holding times.
4. All results presented in this report are derived from samples that met LvLI's sample acceptance policy.
5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits.
6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).
7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.
8. All ICP Interference Check Standards were within control limits.
9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to the Inorganics Laboratory Control Standards Report.
10. The matrix spike (MS) recovery for 1 analyte was outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.
11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A serial dilution is performed for Mercury. A PDS was prepared at meaningful concentration level for the following analytes:

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 14 pages.

<u>Sample ID</u>	<u>Element</u>	<u>PDS</u> <u>Concentration (ppb)</u>	<u>PDS</u> <u>% Recovery</u>
B17107	Antimony	100	105.6

12. All duplicate analyses were within the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.
13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.
14. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.


 Iain Daniels
 Laboratory Manager
 Lionville Laboratory Incorporated
 gmb/m05-428

06-04-03
 Date

METALS METHOD GLOSSARY

The following methods are used as reference for the digestion and analysis of samples contained within this

Lot#: 0305L428

Leaching Procedure: 1310 1311 1312 Other: _____

CLP Metals Digestion and Analysis Methods: ILM03.0 ILM04.0

Metals Digestion Methods: 3005A 3010A 3015 3020A 3050B 3051 200.7 SS17
 Other: _____

Metals Analysis Methods

	SW846	EPA	STD MTD	EPA OSWR	USATHAMA
Aluminum	6010B	200.7			99
Antimony	6010B 7041 ^s	200.7 204.2			99
Arsenic	6010B 7060A ^s	200.7 206.2	3113B		99
Barium	6010B	200.7			99
Beryllium	6010B	200.7			99
Bismuth	6010B ¹	200.7 ¹		1620	99
Boron	6010B	200.7			99
Cadmium	6010B 7131A ^s	200.7 213.2			99
Calcium	6010B	200.7			99
Chromium	6010B 7191 ^s	200.7 218.2			SS17
Cobalt	6010B	200.7			99
Copper	6010B 7211 ^s	200.7 220.2			99
Iron	6010B	200.7			99
Lead	6010B 7421 ^s	200.7 239.2	3113B		99
Lithium	6010B 7430 ⁴	200.7		1620	99
Magnesium	6010B	200.7			99
Manganese	6010B	200.7			99
Mercury	7470A ³ 7471A ³	245.1 ² 245.5 ²			99
Molybdenum	6010B	200.7			99
Nickel	6010B	200.7			99
Potassium	6010B 7610 ⁴	200.7 258.1 ⁴			99
Rare Earths	6010B ¹	200.7 ¹		1620	99
Selenium	6010B 7740 ^s	200.7 270.2	3113B		99
Silicon	6010B ¹	200.7		1620	99
Silica	6010B	200.7		1620	99
Silver	6010B 7761 ^s	200.7 272.2			99
Sodium	6010B 7770 ⁴	200.7 273.1 ⁴			99
Strontium	6010B	200.7			99
Thallium	6010B 7841 ^s	200.7 279.2 200.9			99
Tin	6010B	200.7			99
Titanium	6010B	200.7			99
Uranium	6010B ¹	200.7 ¹		1620	99
Vanadium	6010B	200.7			99
Zinc	6010B	200.7			99
Zirconium	6010B ¹	200.7 ¹		1620	99

Other: _____

Method: _____

METHOD REFERENCES AND DATA QUALIFIERS

DATA QUALIFIERS

U = Indicates that the parameter was not detected at or above the reported limit. The associated numerical value is the sample detection limit.

* = Indicates that the original sample result is greater than 4x the spike amount added.

ABBREVIATIONS

MB = Method or Preparation Blank.

MS = Matrix Spike.

MSD = Matrix Spike Duplicate.

REP = Sample Replicate

LCS = Laboratory Control Sample.

NC = Not calculated.

ANALYTICAL METAL METHODS

1. Not included in the method element list.
2. Modified Hg: Hg1 and Hg2 require less total volume of digestate due to the autosampler analysis. Sample volumes and reagents for mercury determinations in water and soil have been proportionately scaled down to adapt to this semi-automated technique. The sample volume used for water analysis is 33 mL. For soils, approximately 0.3 grams of sample is taken to a final volume of 50 mL (including all reagents).
3. Flame AA.
4. Graphite Furnace AA.

L-WI-033/N-04/98

Lionville Laboratory, Inc.

INORGANICS DATA SUMMARY REPORT 06/02/03

CLIENT: TNUHANFORD F03-012 H2211
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0305L428

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
=====	=====	=====	=====	=====	=====	=====
-001	B17107	Silver, Total	0.14 u	MG/KG	0.14	1.0
		Arsenic, Total	3.4	MG/KG	0.38	1.0
		Boron, Total	2.4	MG/KG	0.22	1.0
		Barium, Total	65.6	MG/KG	0.02	1.0
		Beryllium, Total	0.28	MG/KG	0.01	1.0
		Bismuth, Total	0.59 u	MG/KG	0.59	1.0
		Copper, Total	11.4	MG/KG	0.07	1.0
		Mercury, Total	0.02 u	MG/KG	0.02	1.0
		Nickel, Total	8.9	MG/KG	0.15	1.0
		Lead, Total	5.0	MG/KG	0.27	1.0
		Antimony, Total	0.25 u	MG/KG	0.25	1.0
		Selenium, Total	0.48 u	MG/KG	0.48	1.0

07
03/1/0

Lionville Laboratory, Inc.

INORGANICS METHOD BLANK DATA SUMMARY PAGE 06/02/03

CLIENT: TNUHANFORD F03-012 H2211

LVL LOT #: 0305L428

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
=====	=====	=====	=====	=====	=====	=====
BLANK1	03L0284-MB1	Silver, Total	0.12 u	MG/KG	0.12	1.0
		Arsenic, Total	0.33 u	MG/KG	0.33	1.0
		Boron, Total	0.19 u	MG/KG	0.19	1.0
		Barium, Total	0.03	MG/KG	0.02	1.0
		Beryllium, Total	0.02	MG/KG	0.01	1.0
		Bismuth, Total	0.51 u	MG/KG	0.51	1.0
		Copper, Total	0.06 u	MG/KG	0.06	1.0
		Nickel, Total	0.13 u	MG/KG	0.13	1.0
		Lead, Total	0.23 u	MG/KG	0.23	1.0
		Antimony, Total	0.22 u	MG/KG	0.22	1.0
		Selenium, Total	0.42 u	MG/KG	0.42	1.0
BLANK1	03C0122-MB1	Mercury, Total	0.02 u	MG/KG	0.02	1.0

08

04 1/11/12

Lionville Laboratory, Inc.

INORGANICS ACCURACY REPORT 06/02/03

CLIENT: TNUHANFORD P03-012 H2211

LVL LOT #: 0305L428

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	SPIKED SAMPLE	INITIAL RESULT	SPIKED AMOUNT	%RECOV	DILUTION FACTOR (SPK)
=====	=====	=====	=====	=====	=====	=====	=====
-001	B17107	Silver, Total	5.3	0.14u	5.8	91.4	1.0
		Arsenic, Total	212	3.4	233	89.7	1.0
		Boron, Total	108	2.4	116	90.9	1.0
		Barium, Total	291	65.6	233	96.6	1.0
		Beryllium, Total	5.7	0.28	5.8	93.5	1.0
		Bismuth, Total	549	0.59u	582	94.2	1.0
		Copper, Total	39.0	11.4	29.1	94.8	1.0
		Mercury, Total	0.18	0.02u	0.17	107.1	1.0
		Nickel, Total	64.0	8.9	58.3	94.5	1.0
		Lead, Total	58.9	5.0	58.3	92.5	1.0
		Antimony, Total	40.5	0.25u	58.3	69.5	1.0
		Selenium, Total	200	0.48u	233	85.8	1.0

09

05
H. J. H.

Lionville Laboratory, Inc.

INORGANICS PRECISION REPORT 06/02/03

CLIENT: TNUHANFORD F03-012 H2211

LVL LOT #: 0305L428

WORK ORDER: 11343-606-001-9999-00

SAMPLE	SITE ID	ANALYTE	INITIAL	REPLICATE RPD		DILUTION FACTOR (REP)
			RESULT			
=====	=====	=====	=====	=====	=====	=====
-001REP	B17107	Silver, Total	0.14u	0.13u	NC	1.0
		Arsenic, Total	3.4	3.8	11.1	1.0
		Boron, Total	2.4	2.0	18.2	1.0
		Barium, Total	65.6	74.8	13.1	1.0
		Beryllium, Total	0.28	0.32	15.7	1.0
		Bismuth, Total	0.59u	0.56u	NC	1.0
		Copper, Total	11.4	11.9	4.3	1.0
		Mercury, Total	0.02u	0.02u	NC	1.0
		Nickel, Total	8.9	10.0	11.6	1.0
		Lead, Total	5.0	5.5	9.5	1.0
		Antimony, Total	0.25u	0.24u	NC	1.0
		Selenium, Total	0.48u	0.46u	NC	1.0

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06

7/6/12

Lionville Laboratory, Inc.

INORGANICS LABORATORY CONTROL STANDARDS REPORT 06/02/03

CLIENT: TNUHANFORD F03-012 H2211
WORK ORDER: 11343-606-001-9999-00

LVL LOT #: 0305L428

SAMPLE	SITE ID	ANALYTE	SPIKED	SPIKED	UNITS	%RECOV
			SAMPLE	AMOUNT		
=====	=====	=====	=====	=====	=====	=====
LCS1	03L0284-LC1	Silver, LCS	49.1	50.0	MG/KG	98.2
		Arsenic, LCS	931	1000	MG/KG	93.1
		Boron, LCS	471	500	MG/KG	94.2
		Barium, LCS	505	500	MG/KG	100.9
		Beryllium, LCS	24.2	25.0	MG/KG	96.8
		Bismuth, LCS	491	500	MG/KG	98.2
		Copper, LCS	127	125	MG/KG	101.8
		Nickel, LCS	200	200	MG/KG	99.9
		Lead, LCS	243	250	MG/KG	97.4
		Antimony, LCS	291	300	MG/KG	97.0
		Selenium, LCS	890	1000	MG/KG	89.0
LCS1	03C0122-LC1	Mercury, LCS	6.8	6.2	MG/KG	109.8

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS[illegible]

<p>Special Instructions: S A F # F03-012</p> <p>mer @ - As, Ba, Pb, Se, Ag, Sb, Be, Bi, B, Ni, Cu, Hg</p>	<p>DATE/REVISIONS:</p> <p>1. _____</p> <p>2. _____</p> <p>3. _____</p> <p>4. _____</p> <p>5. _____</p> <p>6. _____</p>	<p style="text-align: center;">Lionville Laboratory Use Only</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Samples were:</p> <p>1) Shipped <input checked="" type="checkbox"/> or Hand Delivered _____</p> <p>Airbill # <u>568</u></p> <p style="text-align: center;"><u>below</u></p> <p>2) Ambient or <input checked="" type="checkbox"/> chilled</p> <p>3) Received in Good Condition <input checked="" type="checkbox"/> or N</p> <p>4) Samples Properly Preserved <input checked="" type="checkbox"/> or N</p> <p>5) Received Within Holding Times <input checked="" type="checkbox"/> or N</p> </div> <div style="width: 45%;"> <p>Tamper Resistant Seal was:</p> <p>1) Present on Outer Package <input checked="" type="checkbox"/> or N</p> <p>2) Unbroken on Outer Package <input checked="" type="checkbox"/> or N</p> <p>3) Present on Sample <input checked="" type="checkbox"/> or N</p> <p>4) Unbroken on Sample <input checked="" type="checkbox"/> or N</p> <p>COC Record Present Upon Sample Rec't <input checked="" type="checkbox"/> or N</p> <p>Cooler Temp. <u>2.2</u> °C</p> </div> </div>
---	--	---

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
FEPEY	Cal. H.	5-16-03	0935				

COMPOSITE WASTE **ORIGINAL REWRITTEN**

FH-Central Plateau Project		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				F03-012-002		Page 1 of 1	
Collector Johansen/Pope/Pfister		Company Contact Steve Trent		Telephone No. 373-5869		Project Coordinator TRENT, SJ		Price Code 9C Data Turnaround 15 Days	
Project Designation 200-PW-2/200-PW-4 OU - Other Solid		Sampling Location 200-PW-2/200-PW-4 Retention Basin		SAF No. F03-012		Air Quality <input type="checkbox"/>			
Ice Chest No. ERC02 406		Field Logbook No. HNF-336-1		COA 117504ES10		Method of Shipment Federal Express			
Shipped To EDERLINE SERVICES (Formerly TMA) RECLA		Offsite Property No. A030 230		Bill of Lading/Air Bill No. SEE OSC					
POSSIBLE SAMPLE HAZARDS/REMARKS N/A Special Handling and/or Storage N/A		Preservation	None	None					
		Type of Container	aG	aG					
		No. of Container(s)	1	1					
		Volume	120mL	1000mL					
SAMPLE ANALYSIS				See item (1) in Special Instructions.	See item (2) in Special Instructions.				
Sample No.	Matrix *	Sample Date	Sample Time						
B17107	OTHER SOLID	5-13-03	1035	B17106					
CHAIN OF POSSESSION				SPECIAL INSTRUCTIONS				Matrix *	
Sign/Print Names				N/A					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
[Signature]		5/13/03 1130		[Signature]		5/13/03 1130			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
[Signature]		5/13/03 1130		[Signature]		5/13/03 1130			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
REFIA 51503		0900		[Signature]		51503 0900			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
[Signature]		51503 0900		FED EX					
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
FED EX		5-16-03 0935		[Signature]		5-16-03 0935			
Relinquished By/Removed From		Date/Time		Received By/Stored In		Date/Time			
LABORATORY SECTION				Received By				Date/Time	
FINAL SAMPLE DISPOSITION				Disposal Method				Disposed By	
								Date/Time	

LIONVILLE LABORATORY INCORPORATED

SAMPLE RECEIPT CHECKLIST

CLIENT: TNU-HANFORD

Shipment Order/Project:

DATE: 5-16-03

F# / SOW# / Release #: F03 - 012

Laboratory SDG #: 03052 428

NOTE: ALL ENTRIES MARKED "NO" MUST BE EXPLAINED IN THE COMMENT SECTION

	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> N/A	<input type="checkbox"/> see Comment #
1. Custody seals on coolers or shipping container intact, signed and dated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Outside of coolers or shipping containers are free from damage?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Airbill # recorded?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. All expected paperwork received (coc and other client specific: historical data, alpha/beta or other screening data as applicable)? (paperwork sealed in plastic bag and taped to inside lid)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Sample containers are intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Custody seals on sample containers intact, signed and dated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. All samples on coc received?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. All sample label information matches coc?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Laboratory QC samples designated on coc? (QC stickers placed on bottles?)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Shipment meets LVL1 Sample Acceptance Policy? (identify all bottles not within policy. See reverse side for policy)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Where applicable, bar code labels are affixed to coc?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12. coc signed and dated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. coc will be faxed or emailed to client?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Project Manager/Client contacted concerning discrepancies? (name/date)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Cooler # / temp (°C) and Comments:

ERC02 406 2.2°

Laboratory Sample Custodian:

Col. King

Laboratory Project Manager: